

Ocean Health Study
Executive Summary

September, 1990

For the full text of this study, please write to the New Jersey Department of Health and Senior Services, Consumer and Environmental Health Services, PO Box 360, Trenton, New Jersey 08625-0360.

In the spring of 1987, the Governor and the Legislature directed the New Jersey Department of Health and Senior Services (NJDHSS) to determine whether microbiological contamination of ocean swimming areas was related to an increased risk of infectious diseases. In response to this directive, the NJDHSS, with the support of the New Jersey Department of Environmental Protection (NJDEP) and local health officials, conducted a series of studies. The studies were a major undertaking and included investigations of beach water quality and health effects of ocean and lake water on beachgoers at nine beaches along the New Jersey shore and two inland lakes. The studies required hundreds of water samples and thousands of beachgoer interviews during the summers of 1987 and 1988. A progress report on the work conducted in 1987 was released in March 1988.

The primary goal of the NJDHSS ocean studies was to determine whether the chlorinated municipal wastewater discharges from sewage treatment plants or microbiological contaminants from stormwater runoff along the New Jersey coast increased the risk of swimming-associated illnesses. The summer of 1987 results were released March 1988. The purposes of this report are to present the study methods and results for the summer 1988 work and to discuss the public health implications of the findings.

Overall, the findings indicate that among swimmers there was no increase in illness associated with sewage or stormwater runoff at any of the study beaches. This result is supported by the finding that ocean beach microbiological water quality was excellent in the summer of 1988.

The beach water quality was found to be excellent in the summers of 1987 and 1988, except for a widely publicized probable sewage treatment plant malfunction that affected an ocean beach area in 1988. Four water quality indicators were used to describe the microbiological contamination of ocean bathing areas; these measures were fecal coliforms, enterococci, the F2 male-specific bacteriophage, and Clostridium perfringens. In 1987 and 1988, levels of all four indicators were very low for nearly all beaches on almost all weekends. Fecal coliform levels were below New Jersey's standard of 200 colony-forming units (CFU) per 100 milliliters (ml) water for all but two beaches on the one weekend when the sewage treatment plant malfunctioned. In addition, the enterococci levels were below the United States Environmental Agency (USEPA) 30-day average guideline of 35 CFU/100 ml for about 95% of the samples. Bacteriophage and C.perfringens levels, which were used for the first time in New Jersey to evaluate beach water quality, also indicated consistently good results.

The 1988 health study focused on examining the causes of Highly Credible Gastrointestinal Illness (HCGI, also known as "stomach virus"), as defined by the USEPA. Other infectious illnesses included in the study were ear infections, eye irritations, skin rashes, and sore throats. Because all of these illnesses may be caused by water contamination and by other factors including person-to-person transmission and because rates of these illnesses are generally quite low, large numbers of people were interviewed in this study. The Ocean Science Advisory Group, composed of representatives from NJDEP, USEPA, the Centers for Disease Control, environmental groups and representatives from academia, provided NJDHSS with suggestions on the study design and selection of beaches used for the epidemiological study reported here.

Water samples were taken and beachgoers were interviewed at nine ocean beaches and two lake beaches from June to September 1988. Individual households were selected on the basis of information obtained by interviewers on the beach and were considered eligible for the study based on swimming patterns and age of household members. Eligible households were telephoned within a few days after the beach visit to determine the health status of all household members. A total of 23,458 households were contacted and screened for the study. Many households were found to be ineligible because members of the household did not meet the age criterion, had illnesses at the time of the beach visit, were at the beach for longer than one weekend or in the same week swam in places other than the ocean or lake beach where the household was interviewed. Nearly 70% of the eligible households completed the initial and follow-up surveys, resulting in 16,089 people (25% under the age of 10) participating in the study.

The findings indicate that swimmers at all beaches had higher rates of symptoms than did nonswimmers. This result is consistent with previous studies conducted in Canada and New York. A higher percentage of swimmers as compared to nonswimmers reported symptoms at all ocean and lake study beaches, indicating that the increases were related to the activity of swimming itself that the places where people swam. It is well documented that the activity of swimming carries with it an inherent risk of these common health complaints.

Overall, the difference between HCGI ("stomach virus") rates among swimmers and nonswimmers in this study was an excess of 12.2 cases per 1000 individuals (1.2%), compared to excesses of 13.3 per 1000 and 4.0 to 16.0 cases per 1000 reported for Canada and New York (Seyfried and Cabelli, respectively). "Stomach virus" symptoms typically interfered with normal activities for no more than one day and did not require a physician's care or hospitalization.

The most commonly reported illnesses among New Jersey beachgoers were red, itchy eyes and sore throat followed by skin rash, HCGI and ear infections. Such symptoms could result from a number of activities because they are quite common in any population. It is likely that the observed illness rates resulted from factors other than sewage contamination and may have been primarily the result of person-to-person transmission of viruses.

Another important activity of summer 1988 was the shore area medical surveillance effort established through the Medical Society of New Jersey. From June to September 1988 NJDOH maintained a special phone line to receive symptom reports from physicians and to provide

consultation to concerned physicians and beachgoers. Less than 20 reports were received by NJDOH.

There are several limitations to the 1988 health study. First, the microbiological water quality was so good, as found by the water quality indicators, that major increases in illnesses would not be expected among swimmers. Second, the extensive media coverage of beach contamination from sources other than sewage appeared to have resulted in significantly reduced numbers of beachgoers, raising concerns that those interviewed in 1988 may not be representative of usual New Jersey beachgoers. Third, the study participants may have been more aware of beach-related concerns because of the publicity and thus may have reported minor illness episodes more often than in previous studies. Fourth, the screening and follow-up interviews had to be relatively brief. Households were screened for eligibility during 10 weekends and were followed up on the telephone a few days after the beach visit. Available time and staffing permitted only essential data gathering on the 16,089 persons in the study. It was not possible to obtain information of other non-swimming related factors that may explain the illness rates observed.

With the above findings in hand, the NJDOH has evaluated the data and developed public health recommendations:

- * NJDOH will continue monitoring illness reports with the assistance of local health professionals.
- * NJDOH endorses continuation of the weekly ocean water quality monitoring programs conducted by local and state agencies to ensure that sewage treatment plants meet state and federal standards and to provide the public with information about the beach water contamination levels.
- * NJDOH recommends that beachgoers heed any official announcement or posting indicating that swimming is restricted based on monitoring results.
- * NJDOH will continue to work with NJDEP to protect water quality at all New Jersey beaches.

Ocean beach water quality has improved through better sewage treatment plant design and operation. We believe that continued improvement in beach water can be accomplished through efforts to identify and eliminate sources of contamination and to implement comprehensive pollution control policies.

This health study is one part of an integrated approach to understand and address ocean pollution and its effects on beachgoers. Ocean pollution control activities are vital to ensure the protection of the New Jersey shore and the health of New Jersey's beachgoers.